REMARKS

The Office Action of October 27, 2009, has been carefully considered.

Claims 6, 9 and 11-12 have been rejected under 35 USC 102(b) as anticipated by Thaxton et al, while Claims 7, 8, 10, 13 and 14 have been rejected under 35 USC 103(a) over Thaxton et al in view of Botvinnik et al.

The invention is directed to a propulsion system for ships and other mobile marine structures, comprising:

1) a synchronous, permanent magnet electrical generator, and

2) a synchronous permanent magnet electrical propulsion motor powered by the output of the electrical generator in a fixed and direct electrical connection thereto.

In accordance with the invention, the synchronous, permanent magnet electric generator and the synchronous, permanent magnet electrical propulsion motor have operating characteristics which are substantially the same.

Thaxton et al discloses a propulsion system for mobile marine structures having a propulsion motor which may be an induction motor, a wound-field synchronous motor, or a permanent magnet motor (column 4, lines 36-38).

The motor is powered by a generator 12 operated by a turbine 11 through a distribution system 13. Even though Thaxton et al does not identify the generator 12 as being a synchronous, permanent magnet generator, the Office action takes the position that electrical generator 12 is a synchronous, inherently permanent electrical generator because "Fig. 3 does not show any excitation input to the magnet." Applicants believe that the assumption made in the Office action is clearly unwarranted and incorrect.

Thaxton et al discloses a propulsion system that utilizes high frequency generators and high RPM prime movers. The system provides substantial weight reduction benefits, but necessitates the use of multiple frequency converters as well

as transformers with phase shifting configuration to reduce system harmonics, interposed between the generator and motor.

Synchronous AC generators are most commonly built with wound rotors that incorporate an excitation machine. The voltage regulator circuitry may or may not be located in the generator housing. Since Thaxton et al does not disclose the AC generator to be the synchronous type at all, the frequency conversion equipment described in the patent is essential to the function of the system both for supplying the main distribution bus and for driving the propulsion motor.

According to the invention, frequency conversion equipment is not necessary between the generator and the propulsion motor because the characteristics of both units are the same. No frequency converter need be provided to drive the propulsion motor, because the RPM of the propeller is regulated by the RPM of the prime mover, in the ratio determined by the number of poles in the machines.

Thus, the generator and the propulsion motor of the invention must not only both be synchronous, permanent magnet devices, but must have substantially the same characteristics, thereby avoiding the use of frequency conversion equipment. Note that claim 6 requires the electrical propulsion motor to be powered by the output of the electrical generator, "with a fixed and direct electrical connection thereto." A fixed and direct electrical connection is clearly shown in the drawings, and is not present in Thaxton et al, in which frequency conversion devices are interposed between the generator and the propulsion motor.

The claimed link between the generator and the motor has inherently low harmonic disturbances, and the ship service system drain is small in relation to generator/motor capabilities.

The influence of harmonics generated by the relatively small frequency converter 16 for powering the ship's service system is of little consequence to the generator/motor. Thus,

the necessity for harmonic dampening devices has largely been eliminated.

Thaxton et al does not include an auxiliary generator, so that the power from all generators disclosed is routed through the main distributing bus which operates at high frequency.

Botvinnik et al is directed to a method and circuitry for controlling an asynchronous-synchronous machine. It has been cited for the purpose of disclosing a ratio between the number of poles in the generator and the number of poles in the propulsion motor in the claimed range, having the generator with fewer poles than the propulsion motor, and the use of an auxiliary generator.

However, the citation of the ratio of poles between the generator and the propulsion motor does not suggest the use in Thaxton et al of a synchronous permanent magnet generator directly connected to a synchronous permanent magnet motor with the same characteristics. Moreover, the system of Botvinnik et al is completely different from that of the claimed invention, Botvinnik et al disclosing an asynchronous-synchronous machine 35 and a converting unit 38 forming an integral an essential part of system control circuitry for modulating an RPM operation. Applicants believe that it is incorrect to call such a device an "auxiliary generator."

As Botvinnik et al does not cure the defects of Thaxton et al, and Thaxton et al does not disclose a synchronous permanent magnet motor and synchronous permanent magnet generator with the same characteristics, withdrawal of these rejections is requested.

In view of the foregoing remarks, Applicants submit that the present application is now in condition for allowance. An early allowance of the application is earnestly solicited.

Respectfully submitted,

Ira J. Schultz
Registration No. 28666
Attorney for Applicants
(703)837-9600, Ext. 23

Dennison, Schultz & MacDonald
1727 King Street, Suite 105
Alexandria, VA 22314